

Appl. No. : 10/759,953
Filed : January 16, 2004

REMARKS

Claims 1-6, 8-19, and 45 are currently pending. Claims 11-13 were withdrawn from consideration. Claims 7 and 20-44 have been cancelled. This is not a surrender of the Applicants' rights in regard to this subject matter, and Applicants reserve the right to pursue this subject matter in another application. Claims 1-10, 14-19, and 45 stand rejected. Claims 1, 3-5, 8-10, 15, and 19 have been amended. Support for the amendments can be found in the claims and the specification, for example, Claims 1, 5, 7, 8, 9, 14, 15, 20, 27, 28, and 41-43; paragraphs 0010, 0023, 0026, 0039, 0062, 0082, 0099, 0112, 0116 and 0117 (of the published specification); and Figures 3, 4A, and 4B. No new matter has been added by these amendments.

Applicants note that the currently pending claims recite a valve device that has particular characteristics. The valve of Claim 1 has an opening that, when fully open, defines a pressure drop across the valve of less than about 0.25 Torr. The valve of Claim 9 has an opening that is sized, when fully opened, substantially equal in width to an inner surface of the piping, and the valve does not have projections, when fully opened, with respect to the inner surface of the piping. Applicants have amended the claims so that the characteristics of the valves are more clearly evident on the face of the claims.

Request for entry of the present amendments

Applicants have amended Claim 1 to incorporate the features of cancelled Claim 7, and to omit unduly limiting features as a result of this incorporation. Claim 9 has been rewritten in independent form with the same unduly limiting features omitted. As noted below, not all of the elements have been taught by the combination of the cited references and a *prima facie* case of obviousness has not been established. Applicants note that the particular valves recited in Claim 1 and Claim 9 were recited in the previous claim set (now cancelled Claim 7 and original Claim 9), and the patentability of these claims was asserted but the Examiner failed to address these

arguments. Thus, no new issues are raised and additional searching should not be required due to the above amendments. Applicants request that the Examiner fully consider, and respond to, these issues in any subsequent Office Action. Applicants note that the previous Office Action was technically insufficient, because it failed to address the Applicants arguments in regard to this matter. In light of this, Applicants invite the Examiner to withdraw the finality of the previous rejection.

Obviousness Rejection

The currently pending claims recite a particular type of valve in combination with the rest of the CVD device. As such, the Examiner's previous rejections that did not address the valve element are moot. This leaves only the Examiner's comments regarding Claims 5-10, which originally included a type of valve. However, as noted above, the previously asserted combination of references does not actually teach the particular type of valve that is presently claimed. Applicants submit that because not all of the elements have been taught, a *prima facie* case of obviousness has not been established. Moreover, prior to the present disclosure, one of skill in the art would not have incorporated the presently recited valve in the recited combinations because the art taught away from such combinations. Thus, even if a *prima facie* case could be established, it would be rebutted by the fact that the art taught away from such a combination.

All of the elements are not taught by Fujimura in combination with the other references

The currently recited valves are a particular type of valve with particular properties. As recited in Claim 1, the valve has an opening that, when fully open, defines a pressure drop across the valve of less than about 0.25 Torr. The valve in Claim 9 has an opening that is sized, when fully opened, substantially equal in width to an inner surface of the piping, and the valve does not have projections, when fully opened, with respect to the inner surface of the piping. An example of such a valve is shown in FIG. 4A and 4B of the Application.

Neither of these valves is taught in Fujimura (U.S. Pat. No. 4,718,976). Nothing in Fujimura suggests that the valve in Fujimura can be opened so that the pressure drop across the valve is less than about 0.25 Torr. Moreover, Fujimura does not suggest the use of such a valve. Similarly, the valve in Fujimura includes projections with respect to the inner surface of the piping when fully opened, contrary to Claim 9. For example, item 22 in Fujimura clearly depicts a projection into the inner surface of the piping and opening 21 in Fujimura is clearly not the same size as the piping. None of the asserted references teach the presently recited type of valve. Thus, the particular valves recited in Claim 1 and Claim 9 have not been taught by the cited references.

The valves in Claim 1 and Claim 9 are different from the valves disclosed in the cited art because the recited valves are configured so that there is a reduced drop in pressure relative to standard valves. In contrast, the valve disclosed in Fujimura results in substantial obstruction of the gas (via projecting structures 22 and/or diffusing plate 25) and thus a substantial change in pressure of the gas across the valve. As such, there is no reason for supposing that the valve in Fujimura would meet the characteristics of the valve recited in Claim 1. Additionally, none of the other asserted references teach such a valve for this purpose either. As such, not all of the elements have been taught, and a *prima facie* case of obviousness has not been established.

As the independent claims are novel and non-obvious, the dependent claims are also non-obvious. The dependent claims contain further distinguishing features of particular utility. Thus, a *prima facie* case of obviousness has not been established for these dependent claims either.

The particular use of the presently recited valve(s) results in a device with superior properties.

Applicants note that the use of the recited valves in the present device is not an arbitrary adjustment to the device. Rather, the use of the recited valves allows one to increase the performance of a CVD device. For example, some of the advantages are as follows:

deactivation (recombination) of fluorine active species is reduced, due to reduced collisions with the piping surface and structure within the valve. Accordingly, applying radio frequency power of less than 3,000 W to the remote plasma discharge chamber, high-speed cleaning at over 2 micron/min becomes possible. Furthermore, reduced collisions also minimizes thermal energy generated when fluorine active species is deactivated, thus reducing overheating of the piping and

the valve. Heat damage to O-rings and other components, and consequent generation of particles is also reduced or eliminated. The frequency with which damaged parts are replaced thus decreases, and operating costs of the device can be decreased while at the same time increasing productivity of the device. ([0026] of the specification).

Thus, this element must be given appropriate consideration in determining patentability of the device. Additionally, as discussed in the following section, the art previously taught away from the use of these valves.

The art previously taught away from an unobstructed flow of cleaning gas.

The most relevant art of record taught to restrict the flow, either due to filters or through the valve itself (*see, e.g.*, 0009-0011 and 0042 of the Application). For example, a “flow restrictor,” which slows down the flow, rather than freely allowing the flow of gas, is specifically taught in U.S. Pat. No. 6,274,058. Additionally, U.S. Pat. No. 5,788,778 (“Shang”), teaches the use of a “flow restrictor” to prevent the free flow of gas. Additionally, Shang teaches that a filter 56 should be placed between the remote chamber 46 and the processing chamber. Applicants note that the use of filters was common and that their use will result in the restriction of the flow of gas.

Moreover, even Fujimura, one of the asserted references, teaches away from the use of the presently recited valves. Applicants note that Fujimura teaches projections 22 with respect to the inner surface of the piping. Furthermore, the identified valve of Fujimura employs a gas diffusing plate 25 which is “fixed in front of the activated gas” (FIGS. 3-5 and col. 3, lines 44-54). As such, it is clear that Fujimura’s “valve” cannot be positioned such that it allows an unobstructed flow of cleaning gas. Thus, the skilled artisan will appreciate Fujimura’s valve will naturally cause a significant pressure drop even when fully open. Applicants note that the resultant obstruction of the gas flow was intentional and desired by Fujimura. Fujimura states that “[t]he gas diffusing means... constitutes the most important feature of the present invention....” The gas diffusing means can comprise the diffusing plate 25 (emphasis added, col. 3, lines 42-44). Clearly, Fujimura teaches that the gas should be obstructed by the valve. Applicants note that the use of a diffusing plate as a valve inherently teaches away from the

recited valves. That is, the presently recited valves have the opposite effect of a diffusing plate in that they do not restrict the flow of the gas. (*See, e.g.*, 0026).

Thus, it is clear that, at the time of filing of the application, one of skill in the art would not have used the recited valves in the recited apparatus because the art was focused on slowing and controlling the flow, rather than using a device that minimized pressure differences on either side of the valve. Indeed, the recited valves are opposite in nature to a diffusing plate valve or flow restricting valves or filters. The Examiner is respectfully reminded that “a *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)” (M.P.E.P. §2144.05 III). As the art clearly taught that items that obstructed the flow of gas were desirable, the art taught away from a valve that “when fully open, defines a pressure drop across the valve of less than about 0.25 Torr” (Claim 1) or a valve that “is sized, when fully opened, substantially equal in width to an inner surface of the piping, and the valve does not have projections, when fully opened, with respect to the inner surface of the piping” (Claim 9).

Applicants note that the above arguments were previously presented, but not addressed in the last Office Action. Applicants request that the claims and the present remarks be fully considered and any subsequent Office Action adequately address the present remarks.

Because the cited references do not teach all of the elements a *prima facie* case of obviousness has not been established. Moreover, even if a *prima facie* case of obviousness had been established, it would have been rebutted by the fact that the above cited references actually teach away from the proposed combination. Applicants request that the rejection be withdrawn and the claims allowed.

CONCLUSION

In view of the foregoing amendments and arguments, Applicants submit that the application is now in condition for allowance and respectfully request the same. If, however, the Examiner feels some issue remains that can be addressed by Examiner Amendment, the Examiner is cordially invited to call the undersigned for authorization.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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